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Abstract. There has been a growing focus in UK policy discourse on pupil well being and the related concept of pupil engagement with school. This is reflected in government initiatives such as the Every Child Matters policy, which is similar to the No Child Left Behind policy in the US. This paper explores the role of individual experiences and school characteristics in determining changes in disengagement between the age of 14 and 16. We carry out the analysis by using data from two waves of the Longitudinal Survey of Young People in England and administrative datasets on schools in England. We find that little seems to affect changes in disengagement from school for the ages we are considering. However we show that being a victim of bullying and attending a school that experiences a fast improvement in its performance are clearly associated with a change in disengagement. We speculate that for the latter, the change in the school environment that accompanies improvements in performance may affect pupils enjoyment and therefore their engagement.

JEL classification: I2.

Keywords: disengagement, longitudinal data, truancy.

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1. Introduction

There has been growing focus in UK policy discourse on pupil well being and the related concept of pupil engagement with school. This is reflected in government initiatives such as the *Every Child Matters* policy, which is similar to the *No Child Left Behind* policy in the US. In the UK, the Every Child Matters initiative (ECM) aims to encourage schools and other professionals to take an integrated approach to child development and specifically children's education, by focusing on the whole child, rather than simply on their academic attainment. In particular, the initiative aims to focus policy on the broader aims of schooling and to place much more emphasis on the general well-being of all children. Although academic achievement continues to be an important marker for student and school success, this shift in policy discourse towards discussion of broader outcomes marks a clear departure from the historic emphasis on academic achievement alone. Certainly the ECM agenda is based on the premise that schools can potentially "produce" a range of outcomes in children, such as psychological well being, engagement with school and positive behaviours. It remains an empirical question however, as to the extent to which schools genuinely do have a major impact on individuals' psychological and physical well being and indeed their attitudes. In this paper we restrict our attention to a particular, and relatively specific dimension of pupil well being, namely pupils' attitude to and engagement with school. We assess how schools' attempts to improve academic achievement affect pupils' engagement with school and the extent to which schools directly influence pupils' engagement with school. We measure school engagement in terms of emotional and behavioural engagement. Emotional engagement is

assessed by subjective questionnaires administered to pupils that ask about their attitudes to school, and behavioural engagement is measured by whether the pupil truants. We ask what pupil and school characteristics appear to influence these forms of pupil disengagement.

Our work fits also into the more general and rapidly growing literature on the determinants of non cognitive skills, of which school engagement is one particular dimension. Academic interest in non cognitive skills is motivated by a number of factors. Firstly, there is a growing body of economic evidence that non cognitive skills are valuable in the labour market. Non cognitive skills, such as attitudes, are of interest in themselves since both cognitive and non cognitive skills, and their interaction, seem to be important in explaining different academic and labour market performances in later stages of life (Cunha and Heckman, 2009; Heckman, 2007; Heckman and Masterov, 2007; Heckman, et al 2006). Hence we as a society might be as concerned with the development of these non cognitive skills as we are in the development of cognitive skills. Secondly, as school based initiatives and policies have often failed to produce dramatic improvements in academic achievement, interest has shifted to the importance of non cognitive skills, such as academic motivation, as a potential way of positively influencing academic achievement. Finally, in the economic field, work by James Heckman and his co-authors has highlighted the fact that cognitive skills are more malleable in the early years of a child's life and non cognitive skills more malleable than cognitive skills in the teen years (Cunha and Heckman, 2009). Since many young people fail to progress in terms of their cognitive development in secondary school, there is hope that we might find alternative ways to improve students' well being and productivity by focusing on their attitudes and behaviours

rather than their cognitive skills. As such, evidence on factors that determine attitudes towards school and truanting behaviour is important as part of this wider debate.

As has been said, this paper seeks to study what affects pupils' engagement with school. School engagement is important since it has been found to itself influence academic and cognitive *outcomes* (Cunha and Heckman, 2009). We therefore need to improve our understanding of the determinants of school engagement, including the role of prior achievement in influencing pupils' attitudes toward school and the role of the school in determining student engagement. Whilst existing evidence suggests that school engagement is determined by an interaction of the individual with the school context and is responsive to variations in the environment, there is little robust empirical evidence on the importance of individual, family and school factors in explaining school engagement, allowing for individual unobserved heterogeneity (Finn and Rock; 1997). Allowing for the tendency for some individuals to be more or less engaged with school, we need to explore the specific factors in individuals' lives and in their schools that affect the formation of their attitudes towards school. We do this exploiting the longitudinal nature of our data and using a fixed effect framework. This enables us to investigate the individual and school shocks that might have a role in affecting the attitude of the young person towards school, controlling for unobserved heterogeneity across pupils in their engagement with school.

2. School satisfaction and engagement

In the educational literature both school engagement and satisfaction have been argued to be decisive factors in explaining academic achievement and drop out decisions. School engagement has also attracted increasing policy attention as a possible antidote to perceptions of declining academic motivation and achievement. As summarised in Fredricks, Blumenfeld & Paris (2004), educational researchers have defined school engagement as a "multidimensional construct" based on three main components that often overlap: behavioural, emotional and cognitive engagement. Behavioural engagement draws on the idea of participation: it includes involvement in academic and social activities and is considered crucial for achieving positive academic outcomes and preventing dropping out. Emotional engagement encompasses positive or negative reactions to teachers and school and is presumed to reflect emotional ties to an institution which influence pupils' willingness to do the required work. Cognitive engagement indicates the willingness of the pupil to exert mental effort to comprehend complex concepts and ideas at school. These three dimensions of engagement are dynamically interrelated. In this paper we focus specifically on behavioural disengagement, as manifested by the pupil's truancy behaviour, and emotional disengagement, as measured by pupils' attitudes to school. We have no direct measure of cognitive engagement, such as hours of homework undertaken or indeed any other measure of mental effort. We therefore focus only on behavioural and emotional disengagement from school and we model these two types of disengagement separately due to data limitations, although we acknowledge that they are closely related.

Most of the empirical literature has focused on ways of defining and measuring these different types of disengagement, and secondly on understanding their determinants. Certainly a continuing theme in the literature is the attempt to find a coherent measure of engagement. For behavioural engagement, researchers have created single scales that combine conduct, persistence and participation (Fredricks et al, 2004). Conduct relates to students' positive behaviours, such as the frequency of absences and tardiness; persistence is the ability to sustain interest in difficult tasks, whereas participation is the level at which students are actively involved in classroom activities. These scales are often based on teachers' assessment or students' self-rating. Most of the studies on emotional engagement also use self reported measures (such as the Rochester School Assessment Package, see Fredricks et al, 2004) which include survey items about a variety of positive or negative emotions related to the school, schoolwork and people at school. Measures of cognitive engagement are rare in the literature.

Regarding the determinants of school engagement, different empirical studies have tried to estimate the impact of pupil-level and school-level factors. Fredricks et al. (2004) summarize the research on the association between behavioural engagement and academic achievement, concluding that a positive relationship exists (more engaged pupils have higher academic achievement) but acknowledging there might be mediating factors affecting this relationship. Connell et al. (1994) also found a positive correlation between disengagement and dropping out of school. Little evidence has been found on the link between emotional engagement and achievement. In the UK context, Bosworth (1994) used Youth Cohort Study (YCS) to study the determinants of pupils' engagement. YCS data includes information on pupils' attitudes to school, as well as information about their truanting behaviour and cognitive achievement (the

latter is measured by examination scores at age 16). The study not only found a clear socio-economic gap in attitudes towards school but also that pupils' attitudes towards school were highly correlated with truancy and examination performance. Indeed this study suggests that pupils' attitudes to school and their truancy both determine pupils' cognitive outcomes. However most of these studies have not been able to eliminate the possibility of endogeneity and simultaneous causality between achievement and engagement, an issue we tackle in this paper.

The literature on the role of schools in determining pupil engagement is somewhat more limited, although from a theoretical point of view, it is hypothesised that the educational environment and the school will indeed have an impact on pupils' level of engagement with education (Mehan et al, 1996). Gibbons and Silva (2008) have examined the relationship between school quality, pupils' happiness or general well being and parental satisfaction. In particular they have focused on examining how parental satisfaction with their child's school and the pupil's enjoyment of school are determined by broader notions of school quality than can be measured simply by academic outcomes. They ask whether other school factors that might impact on pupil well being are also important to parents. To do this work they rely on the LSYPE data set, as we do, but focusing only on the first wave and therefore exploiting only the cross sectional rather than the panel element of the survey. They measure pupil enjoyment using, separately, the pupil's response to three variables describing a) whether the child enjoys school, b) whether the child is bored at school and c) whether the child dislikes his or her teachers. They find a significant relationship between the pupil's progress between KS2 and KS3 and their enjoyment of school. However, school level measures of average academic

achievement, such as the value added by the school between KS2 and KS3, only weakly predicts pupil enjoyment of school (and the relationship is often insignificant). Thus it seems that the academic achievement of the school is only weakly predictive of pupil enjoyment of school. This may be unsurprising given that they find that variation across schools in pupil enjoyment of school is limited (5.7-6.8%). Their analysis therefore suggests that most of the difference in pupil enjoyment is between pupils within the same school rather than varying at school level. However a major drawback of this study is that the authors do not use repeated observations for the same individual over time and therefore they cannot control for time fixed time-invariant individual unobservable characteristics. The availability of a panel and the use of fixed effect methodology would be particularly relevant in this case as it allows for time invariant personality traits that have a large influence on general satisfaction (Ferrer-i-Carbonell and Frijters, 2004).

Another study by Opdenakker and Van Damme (2000) looked specifically at the impact of schools, teachers and classes on pupils' engagement using a multi-level model approach[1] and data from Flanders. They found that schools accounted for a much lower proportion of the variation in well being/engagement than the variation in academic achievement. In other words, their results, although not causal, show that schools appear more important in determining academic achievement than pupils' engagement and enjoyment, consistent with Gibbons and Silva (2008).

A recent report from the Department for Children Schools and Families (2009) focuses on disengagement from school and from education more in general, using many outcomes

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[1] Their model has three levels: pupil, class and school

provided in the LSYPE (including the ones used in our paper). They generate associational evidence on the relationship between a number of factors and pupil engagement. Their results suggest the following factors are related to pupils' engagement with school: schools working with parents, provision of information and guidance, homework supervision, extra curricula activities, study support, the quality of the relationship with teachers, the curriculum, reductions in bullying and whether there is a school culture of truancy.

A particular aspect of behavioural disengagement is truancy which has received a great deal of attention from policy makers and in the UK different initiatives to reduce unauthorised absences in schools have been recently introduced[2]. Different papers have looked at the determinants of truancy, although none of them have considered the central role of school characteristics. Dustman, Rajah & Smith (1997) study the link between the student working part time whilst in school and truancy in the UK using data from the National Child Development Study, which is a study of children born in 1958 and going through the school system in the 1960s. They find that the probability of playing truant increased with the numbers of hours worked. Taking endogeneity into account, they find a significant effect of part-time working on truancy for females only[3]. Those who did more part-time working had higher rates of truancy. As far as other determinants of truancy are concerned, Dustmann et al (1997) find that pupils' measured ability and parents' education had a negative impact on truancy, while

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[2]   For example, recent policies by the Labour government, such as the Anti-Social Behaviour Act of 2003, have introduced penalty notices for truants and parenting orders to combat such occurrences (see Buscha, 2008).

[3]   They use the unemployment rate and the percentage of married women participating in the labour force at the local authority level as external factors influence the numbers of hours worked (in technical parlance, these are instrumental variables). The idea is that these local labour market indicators should affect the supply of labour, but are likely to be uncorrelated with truancy directly.

truancy was increased by paternal unemployment. No effect of household income on truancy behaviour is found and they were unable to look at the role of schools.

Burgess, Gardiner & Propper (2002) use a structural model to determine whether truanting behaviour responds to economic incentives. Their idea is that truancy is the result of a rational decision process based on the comparison between the economic value of schooling and the value of other activities the pupil can undertake whilst being of mandatory school age. In particular, they put forward a model of time allocation to various competing activities: school attendance, being in paid work and engaging in crime. In this framework truancy is the outcome of a rational choice by individuals who maximise their expected payoff from the three activities. Their estimates (based on a US panel dataset, the NLSY79) reveal that the economic rate of return to school, work and crime do in fact affect truancy. In particular, it seems that pupils with higher expected returns from studying are more likely to be in school, whilst those who have higher returns in the labour market, or who live in areas where the gains from crime are greater, have higher rates of truancy. Other factors, such a family background, are also found to explain truanting behaviour. This paper constitutes an interesting attempt to provide a theoretical framework to truanting behaviour and highlights that truancy is not only related to personal and family characteristics but is also a function of other area and labour market characteristics that affect the benefits of school, the value of working and the payoff from crime.

Our paper builds on and extends this previous literature by adopting a longitudinal perspective that allows us to analyse the role of pupil- and school– level determinants of truancy and school disengagement, taking into account individuals' time invariant characteristics and personality traits. In fact, although it has been recognised that school engagement has potentially important implications for academic success (Fredricks et al., 2004), there are few economic studies that have thoroughly investigated the role that school characteristics might play in determining engagement and this is therefore what we focus on in this paper.

3. The Model

This section presents our empirical strategy to model the outcomes of interest, namely emotional disengagement and behavioural disengagement. We assume a linear relationship between the continuous outcomes of interest and the explanatory variables:

$$ED_{it} = Z_{it}^{'}\beta + X_{it}^{'}\gamma + \psi u_i + \varepsilon_{it}$$
$$BD_{it}^{*} = Z_{it}^{'}\delta + X_{it}^{'}\phi + \varphi u_i + \xi_{it}$$

where our outcomes are emotional disengagement (ED) and behavioural disengagement (BD[*]), Z_{it} is a vector of school time-varying characteristics, X_{it} a vector of individual time variant characteristics. We also include individual fixed effects, u_i, represented by a dummy equal to one for the individual, zero otherwise.

However we do not observe behavioural disengagement but only the action we assume pupils take when their behavioural disengagement exceed a certain threshold, namely whether they played truant or not (represented by the binary variable T)

$$T = I[BD_{it}^{*} > 0]$$

Therefore for behavioural disengagement we consider a fixed effects logit model with the errors ξ_{it} that are identically and independently distributed as logistic with mean zero and variance $(\pi)^2/3$.

By taking into account individual fixed effects we control for some of the endogeneity that arises due to sorting into schools and for the correlation between observable and unobservable characteristics that are time invariant. Pupil fixed effects account for all student and family factors that do not vary over the period of observation and that affect the pupil's disengagement. For example, if students with more motivated parents have higher levels of engagement with school, this fixed characteristic of their family will be controlled for in the fixed effect model. However we cannot control for fixed differences in schools that are not perfectly correlated with the student fixed effect or included covariates. These differences might be correlated with school quality, thus generating biased coefficients for those school level variables that capture school quality. For example, if a change in head teacher causes a change in school quality and a change in pupils' attitudes towards school, the coefficients on the school quality measures will be biased since the unobserved and time variant factor (head teacher leadership) is not controlled for in the model.

The model includes a range of time varying individual and school characteristics that should control for potential shocks that might determine school engagement. Despite the richness of our data however, we might still face the possibility of time varying unobserved heterogeneity correlated with the explanatory variables, a problem that is inherent with any fixed effect approach. Even more importantly, we cannot solve the problem of reverse causality between academic achievement and engagement, and we do not model the reciprocal influence of emotional and behavioural disengagement. We therefore treat the estimated coefficients as indicative correlations rather than measures of robust causality.

4. Data description

This paper uses data from the Longitudinal Study of Young People in England (LSYPE) matched to administrative data collected by the Department for Children, Schools and Families (DCSF). The LSYPE is a survey of about 15,770 young people in England who were aged 13 and 14 in 2003/2004. These pupils have been followed and interviewed on an annual basis. The survey provides detailed information on pupils' personal characteristics, attitudes, experiences and behaviours, as well as on family background, household composition and parents' characteristics and aspirations. The survey includes pupils attending maintained state schools, independent schools and pupil referral units; however, in our analysis we restrict our sample to pupils in maintained state schools only[4]. Our analysis is based on the first and the third waves of the survey which cover schooling years 9 and 11. We base our analysis on these two years of

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[4]   The LSYPE used a two-stage sampling design that oversampled more deprived schools and then over-sampled pupils from the major minority ethnic groups (Indian; Pakistani; Bangladeshi; Black African; Black Caribbean; and Mixed) within schools. Therefore the sample is not fully representative of the population.

the survey because for these years we have contemporaneous measures of our key disengagement variables and school attainment (namely key stage 3 and key stage 4). This enables us to control for cognitive outcomes when studying disengagement. Our final matched sample includes over 9,000 individuals for which we have full information on all the relevant variables.

LSYPE data have been matched to the *National Pupil Database* (NPD) that provides information on pupils' achievement in standard national tests (Key stage tests), to the *Pupil Level Annual School Census* (PLASC) that contains a number of pupil-level background characteristics and to the *LEA and School Information Service* (LEASIS) that contains school level characteristics. This linked data provides us with comprehensive information on pupil achievement at Key stages 2, 3 and 4, as well as a range of other pupil level characteristics from the education administrative data, such as whether the student was eligible for free school meals, has English as an additional language or has special educational needs.

4.1: Dependent variable(s)

This paper focuses on two outcomes of interest: a measure of pupils' emotional engagement with school and a dummy variable that indicates if the young person has played truant in the past year, which is used as a proxy for behavioural engagement. The former is a ranking measure based on 12 questions from the LSYPE self completed part of the interview to the young person. For each of the following 9 items:

1) I am happy when I am at school;

2) School is a waste of time for me;

3) School work is worth doing;

4) Most of the time I don't want to go to school;

5) On the whole I like being at school;

6) I work as hard as I can in school;

7) In a lesson, I often count the minutes till it ends;

8) The work I do in lessons is a waste of time;

9) I get good marks for my work.

pupils are asked how much they agree with the statement. They choose values between 1 and 4, where 1 is "strongly agree" and 4 is "strongly disagree". A conventional way to aggregate these item responses in order to create a ranking measure of the latent variable that underlies them would be to create a sum score, as shown in Figure 1 below. In this paper we will consider another approach developed by Wittkowski (2004) and based on univariate statistics. This method does not impose any assumption on the functional relationship between the item responses and the latent factor (emotional disengagement), only that a higher ordinal value for the item response implies greater disengagement, keeping the other variables constant.

Multivariate ordinal variables create problems in generating a ranking of the underlying latent trait when, within the comparison group, there are ties for some item responses or when some individuals have higher scores than their peers in some items and lower in others[5]. Increasing

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[5] Consider two individuals in our sample with the following observed item responses for the eight questions on feelings about school: (2, 1, 3, 2, 3, 1, 2, 2) and (3, 2, 4, 3, 4, 3, 3, 4). We can then say that the second individual

the number of the individuals in the comparison group or increasing the number of item responses that reflect an underlying factor increases the probability of these difficulties. Summing over the item responses does not allow us to differentiate between individuals that obtain the same total score but provide different answers for the same item responses. Moreover a ranking based on the sum score does not allow for much variation between individuals and within individuals over time.

According to Wittkowski, although individuals cannot be compared on a pair-wise basis, they can still be assigned a ranked score. Let I be the indicator function, then:

$$I(x_{j'} < x_j) = \begin{cases} 1 & if \quad x_{j'} < x_j \\ 0 & if \quad x_{j'} \quad and \quad x_j \quad cannot \quad be \quad ordered \\ 0 & if \quad x_{j'} > x_j \end{cases}$$

Where $x_j = (x_{j1}, \ldots, x_{jL})$, and $j=1, \ldots, N$ is the number of individuals and L is the number of item responses. Individuals are compared in a pair-wise manner and each one is given a score by counting the number of individuals with lower scores and subtracting the number of those with higher scores. This is the mu-score, which is then defined by the formula:

$$u(x_j) = \sum_{j'} I(x_{j'} < x_j) - \sum_{j'} I(x_{j'} > x_j)$$

has higher disengagement than the first since he has given strictly greater answers for all questions. However if the observed item responses are (2, 1, 3, 2, 3, 1, 2, 2) and (2,1, 3, 3, 4, 3, 1, 1) the two individuals cannot be compared since they scored the same in the first three questions but then the first individual scored lower values than the second for questions 4, 5 and 6 and higher values for questions 7 and 8. In these case the two individuals cannot be ordered.

The final scale has a negative interpretation, which means that the higher the score, the more negative is the young person's emotional engagement with school and is presented in Figure 2. The correlation between the traditional sumscore measure one can construct (Figure 1) and our preferred mu-score measure (Figure 2) is high, 0.93 in wave 1 of the survey and 0.92 in wage 2.

Figure 1 below shows the distribution of the emotional disengagement variable (ED) for the relevant two waves of the LSYPE survey based on the sumscore approach. We can observe a time trend such that low values of the scale are more likely in Wave 1 of the LSYPE survey than in Wave 3 of the survey, implying that a general increase in disengagement comes with age, as pupils move into the teen years. This pattern is reproduced in Figure 2 which shows the distribution of our preferred mu-score measure of emotional disengagement. Henceforth we present results using our preferred mu-score measure.

This paper models the determinants of emotional and behavioural disengagement from school and the relationship between educational attainment and school engagement in particular. However, the motivation for the research is the fact that disengagement from school is associated with a range of other behaviours that we might also be concerned about. In particular, as shown in Table 1, emotional disengagement is associated with various types of illegal or undesirable activities, such as taking alcohol, cannabis, being in trouble with the police and fighting. Table 1 gives the mean emotional disengagement mu-score for those engaging and not engaging in these activities. In every case, those engaging in the undesirable

activity are more disengaged from school. Clearly these are not necessarily causal relationships. Nonetheless, they are of sufficient interest to prompt our more extensive investigation below, where we attempt to explain the factors that determine pupils' disengagement with school.

As we can see from tables 2 and 3, the mean value of the ED mu-score is similar across gender, slightly higher for males than for females and for both genders higher in the third wave than in the first. Thus males appear to have a slight tendency to be more disengaged from school emotionally than girls.

The second outcome in our analysis that we considered is a self-reported dichotomous indicator for whether the young person has played truant in the last 12 months. This measure may be affected by misclassification and even if not subject to measurement error, it can still produce less efficient estimates than if we had a continuous measure of truancy, such as the number of unauthorized absences during the academic year. An external individual measure of truancy is collected in the National Pupil Database, namely the number of unauthorised half days missed by the pupil. However this measure of truancy was not available to us for wave 2 of the LSYPE and hence we rely on self report measures that we have at two points in time. As we can see from tables 2 and 3, the percentage of truanting pupils is similar across genders and increases as expected between years 9 (age 14) and 11 (age 16).

4.2: Explanatory variables

We include in the analysis two types of explanatory variables, those reflecting school features on the one hand and those measuring pupils' characteristics on the other hand.

Given that our estimation strategy will allow us to control for all time invariant variables, we only control for school-level and pupil- level variables that change over time and that may reflect shocks that occurred over the three year period we examine.

As mentioned above, our main focus is on school-level characteristics. School-level variables are mainly taken from LEASIS[6], EduBase[7] and PLASC[8]. In particular, we control for measures of school performance (value added computed in a similar manner to that proposed by Ray, 2006[9]), resource inputs (pupil-teacher ratio; school size) and school disadvantage (the percentage of students eligible for free school meals, which identifies students from poor families, who have special educational needs and who have English as an Additional Language – or belonging to an ethnic minority group). These variables are commonly used in education research in the UK as they reflect the socio-economic and educational disadvantage of pupils. Descriptive statistics for these variables are provided in Tables 2 and 3 above.

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[6]   Local Education Authority and School Information Service

[7]   Register of all educational establishments in England and Wales, maintained by the Department for Children, Schools and Families.

[8]   Pupil Level Annual Schools Census

[9]   Ray calls this measure the "median method" to evaluate school performance. The scores are computed as "the average for each school of the differences between each pupil's actual result and the national median result for pupils with their prior attainment score".

We are particularly interested in the relationship between school performance and children's engagement with school. We therefore include a measure of school value added, which we interpret as a measure of school quality since it measure average pupil progress in the school and takes account of different pupil intakes. More specifically we use the school mean value added from KS2 to KS3 for the first wave of the survey, and school mean value added from KS3 to KS4 for the third wave. This score measures the progress that pupils at the end of key stage 3 and 4 respectively have made in a given school since taking their previous key stage. It is constructed as the average (arithmetic mean) of the value added scores for all pupils in the school. For instance, a pupil's value added score from KS3 to KS4 is calculated by comparing their best eight results at GCSE and equivalent (standardized capped point score) and the median or middle standardized performance of other pupils with the same or similar standardized results at KS3[10].

We also control for (time varying) *individual* level characteristics. First we control at the individual level for whether the pupil is eligible for Free School Meals as an indicator for poverty status. This variable changes over time largely according to parents' employment status and may therefore pick up shocks in household income.

We control for other types of family-related shocks by including a measure of parental marital status. In particular, we included a dummy for whether the young person belongs to a single

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[10] A more detailed explanation on how value added measures are calculated for a school, including how to work out a pupil's best eight results when they have taken a mix of different qualifications can be found in the Value Added Technical Information section on the Achievement and Attainment Tables website at www.dcsf.gov.uk/performancetables/schools_05.shtml

parent household: in the fixed effect estimation this variable will capture parents' divorce or separation, which are likely to affect pupils' general well being and attitudes.

We also consider another individual level variable that measures the extent to which pupils have been victims of bullying at school. The LSYPE questionnaire contains a set of questions regarding bullying at each wave. Questions are asked of both parents and children and we chose to use parent-reported measures as they are less subjective and less related to pupils' attitude toward schools (see Gibbons and Silva, 2008). Parents are asked to state whether the pupil had been the victim of any of the following bullying behaviours in the past 12 months:

1. Called names by other pupils at his/her school;

2. Sent offensive or hurtful text messages or emails;

3. Shut out from groups of other pupils or from joining in things;

4. Made to give other pupils his or her money or belongings;

5. Threatened by other pupils with being hit or kicked or with other violence;

6. Actually being hit or kicked or attacked in any other way by other pupils; 7.Experienced any type of racist behaviour by other pupils.

Based on these questions we created a binary variable equal to one if the pupil has experienced any of these types of bullying each year.

Another individual-level variable we control for is the number of hours worked during term time as the literature discussed above has shown that this is likely to affect truancy.

Among the individual-level explanatory variables, we also included academic achievement. This is measured using the standardized sum of test scores obtained in Key Stage 3 and 4. In particular, we used results in KS3, taken at age 14 (taken during the year of the first wave of LSYPE) and results in Key Stage 4 (GCSE[11] and equivalent) at age 16 (taken during the year of the third wave of LSYPE). For Key stage 3 we compute the total score by summing up the marks in the core subjects English, Maths and science. For Key Stage 4, we use a capped average point score[12] - already available in the raw data- that takes into account the pupil's eight highest grades. In order to make the results at different Key Stages comparable, we standardized all the scores so that they have mean 0 and standard deviation 1 within year. This essentially implies that we are using a rank ordering of the pupils in the different Key Stages.

We also include a measure of the pupil's progress in secondary school, namely individual value added between key stage 2 and 3 and key stage 3 and 4. This allows us to consider the relationship between personal academic progress in secondary school and pupils' engagement with school. We might expect that pupils who make more progress in secondary school are those who put more effort into their studying and therefore are the ones who are more engaged with their school.

Tables 2 and 3 above show the mean value and standard deviation of the explanatory variables used in our analysis. The mean values of the variables are generally not significantly different

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[11] General Certificate of Secondary Education

[12] According to the new scoring system introduced between 2002–03 and 2003–04, 58 points were awarded for an A*, 52 for an A, 46 for a B, 40 for a C, 34 for a D, 28 for a E, 22 for F, and 16 for a G. Marks are allocated for standard GCSEs, but also for all qualifications approved for use pre-16, such as entry-level qualifications, vocational qualifications, and AS levels taken early.

for men and women, although the mean value of individual standardised test scores is higher for females than for males and the gap increases in the third wave, as expected from existing literature. We can observe a similar pattern for individual value added. The mean value of hours of paid employment per week is also higher for males than for females in wave 1. In wave 3 the mean values are higher for both genders but now females exhibit a higher mean value for the mean of this variable as compared to males. For all the other individual characteristics (single parent household, FSM status, being a victim of bullying) and indeed the school characteristics, the values of the means are very similar between genders for both waves. It is interesting to notice the difference across waves of the mean value for the dummy "victim of bullying": there is a clear drop between the first and the third wave, for both genders. One reason might be that as adolescents grow up they develop a different perspective and a different sensitivity about the problem and therefore they report to their parents less often about being a victim of bullying. An alternative explanation is that children generally talk less to their parents as they become adolescents and therefore parents are less aware of any bullying.

In Tables 4 and 5 we present the mean values of the explanatory variables for the first and last quartile of the distribution of emotional disengagement measure (ED - where the first quartile of the distribution corresponds to a high level of engagement and the last quartile to a high level of disengagement) and interesting results emerge. Noticeable differences in achievement, individual value-added, the likelihood of being a victim of bullying and the hours of paid employment per week are evident for high and low engaged students. Levels of truancy are lower and levels of achievement higher for more engaged students, as one might expect. The incidence of reported bullying is also lower for more engaged students. Engagement is

somewhat socially graded, for example, a lower proportion of more engaged students are eligible for Free School Meals. More engaged students work fewer hours of paid employment per week and attend marginally better resourced schools (with a lower pupil teacher ratio) with higher value added mean school achievement. Interestingly pupils who are more engaged are more likely to attend a school with a *higher* proportion of students who are English as an Additional Language, consistent with recent evidence that ethnic minority students exceed the performance of white British students in secondary school (Wilson, Burgess, and Briggs, 2006). These differences are qualitatively similar across both waves although the magnitude of the gaps varies, many increasing in the later wave.

5. Estimation results

The first three columns of table 6 present the results from OLS models of emotional engagement (measured by our ED mu-score scale), the second set of three columns present the results from our preferred fixed effect models. The fixed effect model allows for time invariant individual heterogeneity and exploits within individual differences. We prefer these latter models, as we argued earlier, because we believe that there may be unobserved characteristics of individuals which are correlated with key explanatory variables (e.g. indicators of socio-economic background) and with our dependent variable. The limitation of the fixed effect model is of course that only variables that change overtime can be included. Comparison of the OLS and fixed effect models does suggest that many of the individual characteristics that are significant in the OLS model become insignificant in the fixed effect model once we allow for

individual unobserved heterogeneity. This implies we should indeed be cautious about the OLS results.

We start by considering the role of school characteristics, as this is our prime focus. In the OLS results some school related characteristics are associated with pupils' emotional disengagement, namely the percentage of pupils who have English as an additional language and, once we control for pupil level factors, the school value added. This latter result suggests that schools that have higher value added also have more disengaged pupils. Our measure of school resources, namely the mean pupil teacher ratio, is insignificant in the OLS models. We are conscious however that some of the school characteristics included in the model are also correlated with unobserved characteristics of individuals, i.e. there is individual sorting of pupils into different types of school on the basis of unobserved characteristics, such as parental attitude. We therefore need to control for this with the pupil fixed effect model.

The fixed effect results are indeed very different. The only coefficient that remains significant is that on the school value added variable. In a fixed effect specification, we are in effect measuring the relationship between a change in school value added and changes in pupils' individual emotional engagement. We find that schools that are improving their value added have pupils who are becoming less engaged with school. This may be unsurprising given that schools may have to undertake unpopular activities, such as enforcing homework or increasing emphasis on literacy and numeracy, in order to bring about an improvement in their value added score. In other words we may be capturing the real cost of improving value added that occurs, not in the form of increased expenditure per pupil, but rather increased effort per pupil

and the subsequent (potentially short term) reductions in their engagement with school. This is a controversial result that we return to in the discussion below.

It is also evident from Table 6, that there is an association between some individual characteristics and emotional engagement with school. On average higher achieving pupils have higher levels of emotional school engagement (are less disengaged). This result is evident in both the OLS results and the fixed effect models. Individual value added however, i.e. the progress made by the individual pupil in secondary school, seems not to be correlated with emotional engagement once we control for unobserved heterogeneity in the fixed effect model.

In the OLS model, pupils who belong to a single parent household are more likely to be disengaged but this result does not hold in the pupil fixed effect model.

In the OLS model, students who are eligible for Free School Meals, i.e. more deprived students, are actually more likely to be emotionally engaged with school once we allow for their other characteristics. This would be hard to explain and in fact we find that this result disappears once we use a fixed effects approach, suggesting that the FSM dummy variable in the OLS regression is picking up unobserved individual heterogeneity correlated with being eligible for free school meals. This result would suggest that there are other characteristics of pupils, such as underlying motivation that are not included in the model and are correlated (positively) with FSM.

Pupils who have been a victim of bullying and who work more hours per week in paid employment are all more likely to be emotionally disengaged in the OLS model. In the fixed effect specification however, these effects largely disappear with the exception of being a victim of bullying which remains significantly and negatively correlated with emotional engagement. Thus pupils whose parents report that they have been bullied are also more disengaged from school.

Table 7 shows the logit and conditional (fixed effects) logit estimates of the models of truancy. We start by considering the relationship between school characteristics and being truant. Logit estimates suggest that school size and school value added are *positively* associated with the probability of being truant, i.e. being in a larger school and having higher school value added is associated with higher rates of unauthorised absence. Being in year 11 is also associated with a higher probability of being truant. However these results change when we allow for unobserved heterogeneity using the conditional logit model. School value added remains significant but with a negative sign this time, suggesting that schools that are improving have smaller increases in pupil truanting behaviour.

We now turn to the individual characteristics in the model and we can see from the logit that pupil achievement and pupil progress (value added) are associated with a lower probability of truancy, whereas being in a single parent household, being eligible for Free School Meals, being bullied and working a positive number of hours per week is associated with higher probability of being truant. However, many of these results do not remain significant when we control for unobserved heterogeneity in the conditional logit model. Specifically, from the

conditional logit model estimates we see that only being bullied and being in a paid employment remain significantly related to the likelihood of being truant.

6.   Conclusions

In this paper we model the determinants of both emotional disengagement from school and truanting behaviour, controlling for unobserved heterogeneity. We find that pupils who are attending schools that are improving their academic achievement levels, as measured by their school value added scores, are on the one hand becoming *less* positive in the attitudes towards schools but equally are also less likely to have increasing rates of truancy. This is a striking result given that our models control for pupil fixed effects, i.e. constant unobserved characteristics of individuals that might be correlated with both emotional engagement with school and truanting behaviours.

We hypothesise but cannot prove that these results may reflect the fact that in the process of improving school value added scores, with increasing emphasis on test score performance, some pupils become less engaged with school. We must be clear here however. We are not suggesting that "good" schools with higher levels of academic achievement have less engaged students. We are certainly not saying that individuals who are improving academically are less engaged with school. Rather we are modelling the effect of a change in a school's value added (therefore in the school environment) and its impact on pupils' engagement with school and truanting behaviour. We hypothesise that this negative relationship may reflect the increased stress levels and emphasis on academic achievement that comes along with an attempt to bring

about school improvement and it is perceived by the pupils as a change in the school environment. This may of course be a short run negative impact, an issue we cannot test in our data. Clearly however, this is an issue that requires further (qualitative and quantitative) study.

We are also mindful of caveats we may wish to add to the analysis. Most crucially of all, our previous work (Meschi and Vignoles, 2009) has suggested that not only do schools play a relatively limited role in determining the cognitive achievement of pupils but that the role of the school in influencing pupils' engagement with school is even more limited. Clearly individual characteristics and family background matter more on both these counts. Our measure of behavioural engagement is also limited and with better data we might want to explore more nuanced indicators of behavioural disengagement than simply whether someone truants or not. Equally our measure of emotional disengagement, whilst consistent with the rest of the literature is self report and not measured under controlled conditions. That said our findings are at a minimum enough to give those focused on school improvement reason to continue the focus on non cognitive aspects of children's development. Whilst these results potentially give ammunition to those who claim that we are over testing English pupils with our league table approach to school quality, we would argue that in fact they lend support to the view that there is a limit to what schools can do in promoting pupils' engagement. We do however, need to recognise that change can be challenging and find ways to engage students better with attempts to raise standards in our school system.

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Figure 1: Distribution of emotional disengagement (sum of item responses) by waves
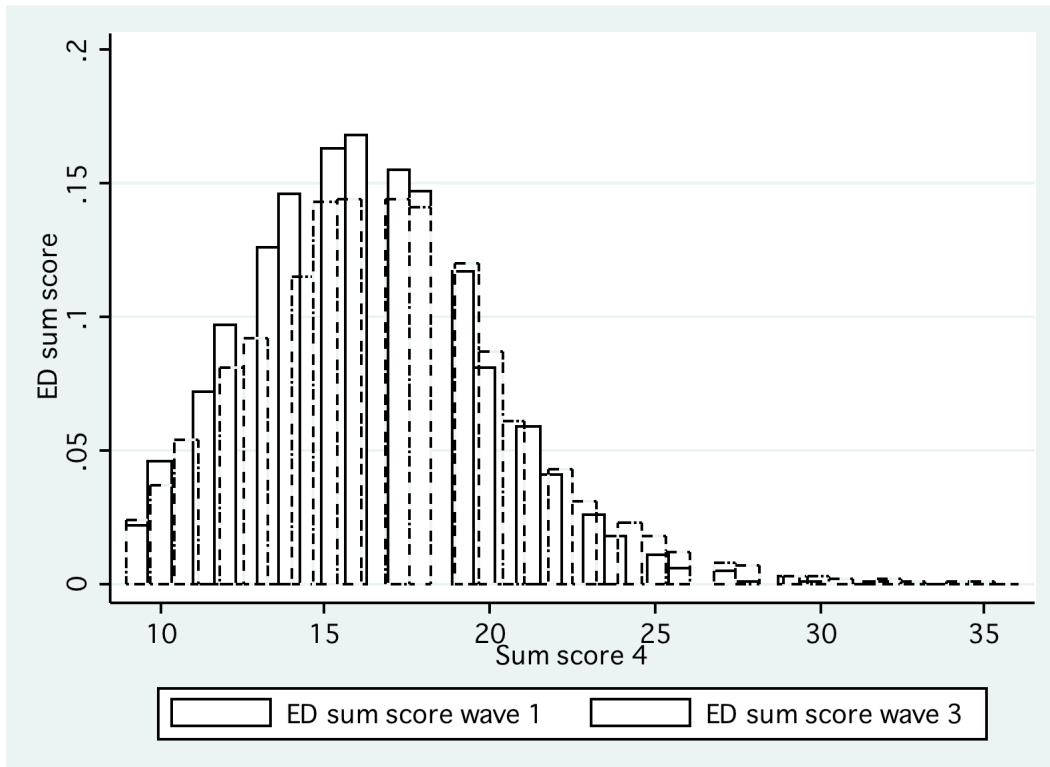
Figure 2: Distribution of emotional disengagement (mu-score) by waves
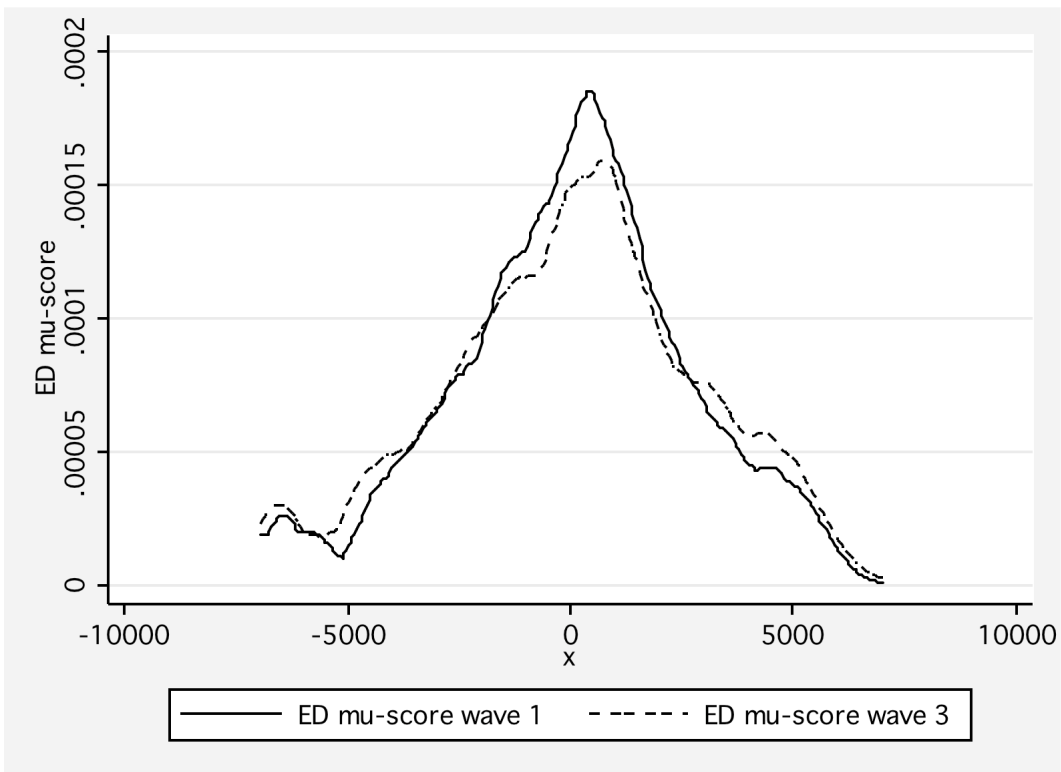
Figure 3: Distribution of emotional disengagement (mu-score) by gender
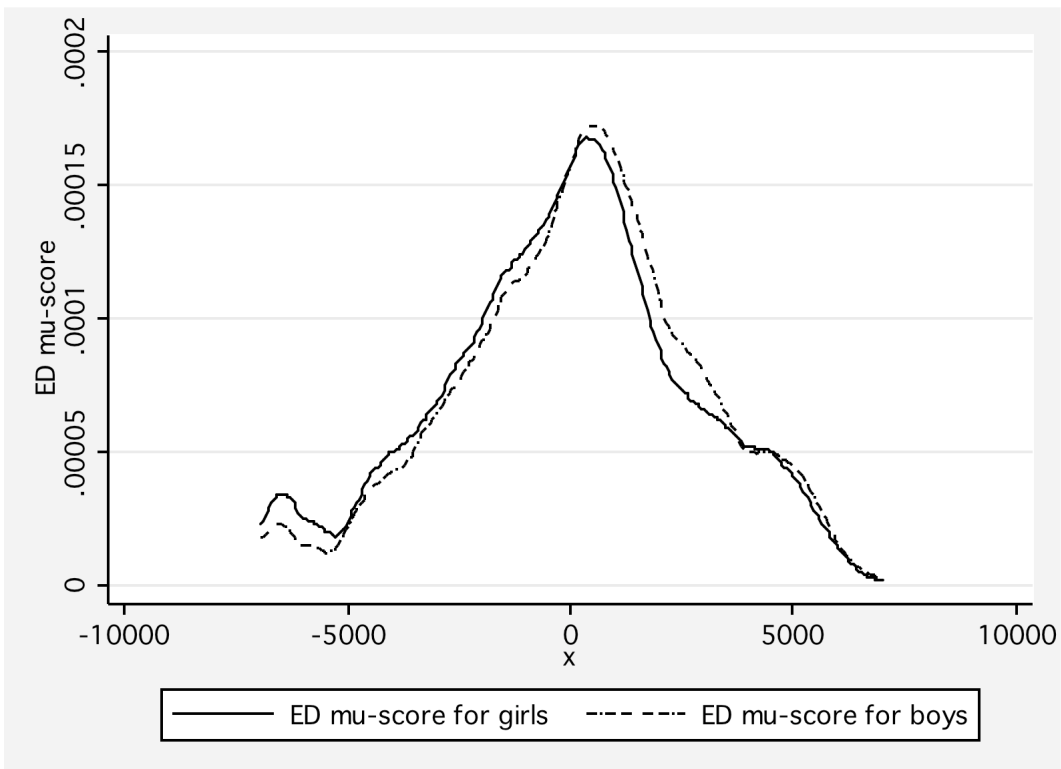
Table 1: Mean of ED mu-score by behavioural outcomes[13]

Dichotomous outcome	Value 0	Value 1
Whether young person has had proper alcoholic drink	-920.358	447.104
S.D.	(2840.813)	(2888.340)
Whether police got in touch because of something young person had done	-42.954	1911.177
S.D	(2929.285)	(2543.279)
Whether young person ever tried cannabis	-400.825	1335.109
S.D.	(2893.376)	(2683.766)
Whether young person has taken part in fighting	-268.016	1683.28
S.D.	(2902.525)	(2600.333)
Whether young person has taken part in shop lifting	-129.384	1821.077
S.D.	(2921.061)	(2579.700)
Whether young person dropped out at 17	-422.219	1172.782
S.D.	(2865.160)	(2822.165)

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[13]   The difference between the means is statistically different from zero for all variables in this table.

Table 2: Descriptive statistics for key variables, wave 1 by gender

Wave 1 – 2004	Girls			Boys		
	Obs	**Mean**	S.D.	**Obs**	**Mean**	S.D.
ED mu-score	3584	-148.078	2789.759	3518	150.86	2636.97
ED sum score	3584	15.999	3.675	3518	16.41	3.59
Played truant	3474	0.119	0.323	3406	0.11	0.32
Achievement	3584	0.292	0.812	3518	0.23	0.87
Individual Value Added	3584	0.001	0.547	3518	-0.06	0.57
Single parent	3584	0.232	0.422	3518	0.21	0.41
Eligible for FSM	3584	0.170	0.376	3518	0.15	0.36
Whether bullied	3584	0.438	0.496	3518	0.42	0.49
No of hrs worked	3584	0.663	1.835	3518	1.03	3.15
School size	3584	1148.263	333.457	3518	1135.78	333.28
Pupil-teacher ratio	3584	17.083	1.801	3518	17.07	1.79
School Value Added	3584	0.035	0.195	3518	0.01	0.19
School % of SEN	3584	13.518	8.408	3518	13.71	8.60
School % of EAL	3584	16.574	25.125	3518	13.32	21.95
School % of non white British	3584	27.500	29.731	3518	23.65	26.84
School % of FSM_	3584	13.191	12.993	3518	12.19	12.09
Expenditure per pupil	3555	3.843	0.595	3486	3.83	0.61

Table 3: Descriptive statistics for key variables, wave 3 by gender

Wave 3 – 2006	Girls			Boys		
	Obs	**Mean**	**S.D.**	**Obs**	**Mean**	**S.D.**
ED mu-score	3584	-174.065	2969.168	3518	177.33	2897.91
ED sum score	3584	16.589	4.020	3518	17.07	4.10
Played truant	3512	0.221	0.415	3454	0.22	0.42
Achievement	3584	0.347	0.827	3518	0.17	0.88
Individual Value Added	3584	0.197	0.595	3518	0.07	0.61
Single parent	3584	0.290	0.454	3518	0.27	0.45
Eligible for FSM	3584	0.155	0.362	3518	0.13	0.34
Whether bullied	3584	0.250	0.433	3518	0.25	0.43
No of hrs worked	3584	1.882	3.722	3518	1.70	3.82
School size	3584	1149.107	337.513	3518	1136.47	336.01
Pupil-teacher ratio	3584	16.578	1.651	3518	16.58	1.65
School Value Added	3584	0.019	0.296	3518	0.00	0.29
School % of SEN	3584	15.603	9.690	3518	15.65	9.43
School % of EAL	3584	17.404	25.671	3518	14.08	22.31
School % of non white British	3584	28.097	30.132	3518	24.45	27.55
School % of FSM	3584	12.692	12.346	3518	11.71	11.79
Expenditure per pupil	3555	4.461	0.685	3487	4.45	0.68

Table 4: Descriptive statistics for first and last quartile of ED distribution in wave 1

Wave 1 – 2004	First	Quartile	– high	Last	Quartile	– low
	engagement			engagement		
	Obs	Mean		Obs	Mean	
Whether played truant	1675	0.039	0.195	1557	0.215	0.411
Achievement	1699	0.458	0.762	1639	0.102	0.872
Individual Value Added	1699	0.074	0.466	1639	-0.121	0.602
Single parent	1699	0.190	0.393	1639	0.256	0.436
Eligible for free school meals	1699	0.157	0.363	1639	0.164	0.371
Whether bullied	1699	0.339	0.474	1639	0.511	0.500
No of hours worked	1699	0.809	2.276	1639	0.939	3.692
School size	1699	1137.420	332.793	1639	1125.689	334.439
Pupil-teacher ratio	1699	17.010	1.796	1639	17.105	1.830
School Value Added	1699	0.029	0.183	1639	0.017	0.192
School % of Special Educational Needs	1699	13.722	8.735	1639	13.745	8.237
School % of English Additional Language	1699	17.137	25.361	1639	12.235	21.085
School % of non white British	1699	27.862	29.909	1639	22.461	26.225
School % of FSM_	1699	13.651	13.266	1639	11.780	11.408
Expenditure per pupil	1679	3.873	0.628	1627	3.821	0.568

Table 5: Descriptive statistics for first and last quartile of ED distribution in wave 3

Wave 3 – 2006	First	Quartile	– high	Last	Quartile	– low
	engagement			engagement		
	Obs	Mean		Obs	Mean	
Whether played truant	1830	0.085	0.279	1785	0.398	0.490
Achievement	1856	0.596	0.765	1828	-0.090	0.888
Individual Value Added	1856	0.310	0.586	1828	-0.093	0.642
Single parent	1856	0.234	0.424	1828	0.326	0.469
Eligible for free school meals	1856	0.140	0.347	1828	0.134	0.341
Whether bullied	1856	0.157	0.364	1828	0.345	0.476
No of hours worked	1856	1.554	3.315	1828	2.111	4.333
School size	1856	1150.769	331.544	1828	1131.369	339.437
Pupil-teacher ratio	1856	16.489	1.643	1828	16.690	1.695
School Value Added	1856	0.019	0.298	1828	-0.009	0.273
School % of Special Educational Needs	1856	15.825	10.197	1828	15.872	9.227
School % of English Additional Language	1856	18.052	25.759	1828	12.828	21.609
School % of non white British	1856	29.095	30.252	1828	22.677	26.445
School % of FSM_	1856	12.944	12.648	1828	11.393	10.664
Expenditure per pupil	1842	4.490	0.712	1818	4.420	0.665

Table 6: OLS and Fixed Effect estimates; Dependent variable: ED

	OLS	OLS	FIXED EFFECTS	FIXED EFFECTS
School size	-0.115	-0.018	-0.622	-0.491
	(0.099)	(0.091)	(0.657)	(0.649)
Pupil-teacher ratio	23.306	9.296	7.974	9.241
	(17.076)	(15.946)	(37.269)	(37.808)
School value added	-138.679	697.024***	60.038	342.244**
	(110.273)	(109.972)	(156.639)	(161.908)
School % of SEN	6.733	-6.285	0.765	2.013
	(4.175)	(3.851)	(9.438)	(9.267)
School % of EAL	-10.397***	-9.285***	-7.219	-6.644
	(1.568)	(1.495)	(16.239)	(15.179)
Achievement		-685.044***		-633.376***
		(46.054)		(153.646)
Individual value added		-395.786***		145.959
		(61.385)		(119.882)
Single parent		279.578***		158.268
		(62.963)		(148.274)
Eligible for free school meals		-245.704***		-204.112
		(75.355)		(182.236)
Whether bullied		713.335***		303.470***
		(52.354)		(85.266)
No of hours worked		25.353***		11.583
		(7.179)		(11.382)
Constant	-196.700	-22.518	675.070	502.726
	(335.657)	(314.875)	(1,048.959)	(1,028.520)
Observations	14204	14204	14204	14204
R-squared	0.009	0.094	0.746	0.750

Table 7: Logit and Conditional Logit estimates. Dep. Variable: whether plays truant

COEFFICIENT	LOGIT	LOGIT	CONDITIONAL	CONDITIONAL
Achievement		-0.349***		-0.178
		(0.032)		-0.177
Individual value added		-0.379***		-0.118
		(0.047)		-0.135
Single parent		0.353***		0.213
		(0.046)		-0.167
Eligible for free school meals		0.133**		0.113
		(0.061)		-0.204
Whether bullied		0.711***		0.504***
		(0.043)		-0.095
No of hours worked		0.0292***		0.0247**
		(0.006)		-0.011
School size	0.000126**	0.000241***	-0.001	-0.001
	0.000	(0.000)	-0.001	-0.001
Pupil-teacher ratio	0.009	0.001	0.005	0.003
	0.012	(0.012)	-0.040	-0.040
School Value Added	-0.247***	0.301***	-0.547***	-0.324**
	0.081	(0.090)	-0.141	-0.151
School % of Special education	0.0624***	0.020	-0.030	-0.039
	0.013	(0.014)	-0.072	-0.073
School % of English additional	-0.001	-0.001	0.000	0.000
	0.001	(0.001)	-0.014	-0.014
Year 11	0.766***	0.948***	1.132***	1.207***
	0.042	(0.046)	-0.059	-0.074
Constant	-2.351***	-2.791***		
	-0.232	(0.241)		
Observations	8672	8672	3718	3718
Number of individuals			1859	1859